



MECH203

Mechanical Design 1

S2 Day 2014

Dept of Engineering

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General Information

Unit convenor and teaching staff

Shaokoon Cheng

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Sammy Diasinos

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Credit points

3

Prerequisites

12cp including (ENGG170(P) or ELEC170(P) or ENGG150(P))

Corequisites

Co-badged status

Unit description

In this unit students will develop their skills in machine drawing and engineering design. The unit will demonstrate to students the processes involved in the selection of machine elements and machine assembly design in an engineering context. The unit will introduce students to the principles of computer-aided design and manufacture.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

Learning Outcomes

On successful completion of this unit, you will be able to:

The student will be able to produce two - dimensional and three – dimensional engineering design drawings.

The student will be able to produce manufacturing drawings that meet industrial standards.

The student will be able to identify the usage of different types of permanent (e.g. welding) and non-permanent (e.g. bolts and nuts) joints.

The student will be able to analyse common variables such as power transmission and speed reduction ratio in mechanical engineering systems.

The student will be able to analyse, design and select machine elements (e.g. belts and

pulleys, chain and sprockets, bearings) off-the-shelf using commercial available catalogues or specify appropriate manufacturing techniques for the elements.

General Assessment Information

In order to pass this unit, students need to fulfill the following criteria:

1. Achieve at least 50% marks overall. All students must attend the mandatory final examination.
2. Submit at least one major assignment.
3. Submit at least 3 of 6 tutorial assignments.

The unit will be graded according to the Macquarie University grading policy.

Assessment Tasks

Name	Weighting	Due
<u>Quiz on computer aided design</u>	15%	Week 4, Week 7
<u>Quiz</u>	10%	Week 10
<u>Tutorial</u>	30%	Week 8 to Week 13
<u>Examination</u>	45%	TBA

Quiz on computer aided design

Due: **Week 4, Week 7**

Weighting: **15%**

Two quizzes (7.5% each).

On successful completion you will be able to:

- The student will be able to produce two - dimensional and three – dimensional engineering design drawings.
- The student will be able to produce manufacturing drawings that meet industrial standards.
- The student will be able to identify the usage of different types of permanent (e.g. welding) and non-permanent (e.g. bolts and nuts) joints.

Quiz

Due: **Week 10**

Weighting: **10%**

Quiz.

On successful completion you will be able to:

- The student will be able to produce two - dimensional and three – dimensional engineering design drawings.
- The student will be able to produce manufacturing drawings that meet industrial standards.

Tutorial

Due: **Week 8 to Week 13**

Weighting: **30%**

There will be 6 tutorial assignments (5% each).

On successful completion you will be able to:

- The student will be able to analyse common variables such as power transmission and speed reduction ratio in mechanical engineering systems.
- The student will be able to analyse, design and select machine elements (e.g. belts and pulleys, chain and sprockets, bearings) off-the-shelf using commercial available catalogues or specify appropriate manufacturing techniques for the elements.

Examination

Due: **TBA**

Weighting: **45%**

This will be a closed book exam.

On successful completion you will be able to:

- The student will be able to identify the usage of different types of permanent (e.g. welding) and non-permanent (e.g. bolts and nuts) joints.
- The student will be able to analyse common variables such as power transmission and speed reduction ratio in mechanical engineering systems.
- The student will be able to analyse, design and select machine elements (e.g. belts and pulleys, chain and sprockets, bearings) off-the-shelf using commercial available catalogues or specify appropriate manufacturing techniques for the elements.

Delivery and Resources

Text book:

Richard G Budynas, "Shigley's Mechanical Engineering Design." *McGrawll Hill*, 9th edition.

Unit Schedule

Week	Lecture Topic	Lecturer	Practical/ Tutorial	Due Assignments/ Tasks
Week 1	Introduction to Mechanical Engineering Design and the Australian standard for Manufacturing drawings.	Sammy Diasinos		
Week 2	Using CAD to produce Manufacturing drawings and to design a component in isolation and as a part of an assembly.	Sammy Diasinos	CAD drawing.	
Week 3	Design of Basic Mechanical Systems.	Sammy Diasinos	CAD drawing.	
Week 4	Tolerances.	Sammy Diasinos	CAD drawing.	Assignment.
Week 5	Small volume manufacturing techniques.	Sammy Diasinos	CAD drawing.	
Week 6	Permanent and non-permanent joints.	Sammy Diasinos	CAD drawing.	Quiz.
Week 7	Motors and selection of motors.	Sammy Diasinos	CAD drawing.	Assignment.
Semester break				
Week 8	Belts and pulleys.	Shaokoon Cheng	Motors selection.	
Week 9	Chain and sprockets.	Shaokoon Cheng	Belts and pulley.	

Week 10	Gears.	Shaokoon Cheng	Chain and sprockets.	
Week 11	Bearings.	Shaokoon Cheng	Gears.	
Week 12	Shaft.	Shaokoon Cheng	Bearings.	
Week 13	Revision.	Shaokoon Cheng	Shaft.	

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](#). Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy <http://mq.edu.au/policy/docs/assessment/policy.html>

Grading Policy <http://mq.edu.au/policy/docs/grading/policy.html>

Grade Appeal Policy <http://mq.edu.au/policy/docs/gradeappeal/policy.html>

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

In addition, a number of other policies can be found in the [Learning and Teaching Category](#) of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

IT Help

For help with University computer systems and technology, visit <http://informatics.mq.edu.au/help/>.

When using the University's IT, you must adhere to the [Acceptable Use Policy](#). The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- The student will be able to produce two - dimensional and three – dimensional engineering design drawings.
- The student will be able to produce manufacturing drawings that meet industrial standards.
- The student will be able to identify the usage of different types of permanent (e.g.

welding) and non-permanent (e.g. bolts and nuts) joints.

- The student will be able to analyse common variables such as power transmission and speed reduction ratio in mechanical engineering systems.
- The student will be able to analyse, design and select machine elements (e.g. belts and pulleys, chain and sprockets, bearings) off-the-shelf using commercial available catalogues or specify appropriate manufacturing techniques for the elements.

Assessment tasks

- Quiz on computer aided design
- Quiz
- Tutorial
- Examination

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- The student will be able to produce two - dimensional and three – dimensional engineering design drawings.
- The student will be able to identify the usage of different types of permanent (e.g. welding) and non-permanent (e.g. bolts and nuts) joints.
- The student will be able to analyse common variables such as power transmission and speed reduction ratio in mechanical engineering systems.
- The student will be able to analyse, design and select machine elements (e.g. belts and pulleys, chain and sprockets, bearings) off-the-shelf using commercial available catalogues or specify appropriate manufacturing techniques for the elements.

Assessment tasks

- Quiz on computer aided design
- Quiz
- Tutorial
- Examination

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- The student will be able to analyse common variables such as power transmission and speed reduction ratio in mechanical engineering systems.
- The student will be able to analyse, design and select machine elements (e.g. belts and pulleys, chain and sprockets, bearings) off-the-shelf using commercial available catalogues or specify appropriate manufacturing techniques for the elements.

Assessment tasks

- Tutorial
- Examination

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcome

- The student will be able to produce two - dimensional and three – dimensional engineering design drawings.

Assessment tasks

- Quiz on computer aided design
- Tutorial

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Assessment task

- Quiz on computer aided design

Changes since First Published

Date	Description
14/01/2014	The Prerequisites was updated.